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THE PREVALENCE OF ARCHITECTURAL BARRIERS

By

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DEDICATION

To my husband, Gary,
and my daughters,
Andrea, Carrie, and Elizabeth
for all their patience, love, understanding,
and support.

THE PREVALENCE OF ARCHITECTURAL BARRIERS

By

CHUNG M. SIEDLECKI, BS, MD

THESIS

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SCHOOL OF PUBLIC HEALTH**

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Thesis submitted to the MPH Committee on June 21, 1999

THE PREVALENCE OF ARCHITECTURAL BARRIERS

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One out of every seven people in the United States experiences some limitations in their activities due to chronic health conditions. Many have physical disabilities limiting their mobility and access to goods and services. In 1990, the Americans with Disabilities Act (ADA) was enacted addressing the removal of physical barriers as well as social barriers to employment, services, and goods.

Studies published between 1986 and 1994 demonstrated both positive and negative findings. While access in the community has improved since the passage of numerous civil rights legislations, architectural barriers continue to persist within the community at varying degrees (34 to 84.6 %). No studies have been published since 1994.

A systematic randomized sampling of 200 small business was selected in San Antonio, Texas, for the purpose of determining the prevalence of architectural barriers and compliance with the ADA. Surveys were accomplished on 121 of the 200 (60.5%) selected businesses. Only 4/121 (3.3%) of the businesses surveyed were in complete compliance with the ADA. Barriers continue to persist in the areas of accessible public restrooms (88.2%), parking (86%), ramps (70.2%), doors/entryways (70.2%), water fountains (51.6%), and telephones (50%). Furthermore, 71.9% of the businesses surveyed had additional obstacles that prevented individuals with disabilities from receiving equal access to services and goods. Finally, ninety percent of the business surveyed had more than one area containing architectural barriers. The lack of compliance with the ADA appears to be universal.

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I. INTRODUCTION

A. Brief Background on Disabilities Awareness

With the Thirteenth Amendment and the abolition of slavery (1865), the United States began its long struggle against discrimination. Since that time, numerous civil rights statutes have become laws. The most prominent recent civil rights legislation was the Civil Rights Act of 1964. While it is best known for anti-discrimination against African-Americans, the Civil Rights Act promotes equality for persons, including individuals with disabilities. In 1968, the Architectural Barriers Act was enacted by Congress to ensure that all buildings financed with federal funds were designed and constructed so that they were accessible to persons with physical disabilities. The coverage was broadened through the Rehabilitation Act of 1973, but it was not until President Bush signed the Americans with Disabilities Act (ADA) into law on 26 July 1990 that all public and private entities, regardless of funding, were expected to comply with equal access for Americans with disabilities (Access 1994). The purpose of the Rehabilitation Act, and subsequently the ADA, was to provide equal opportunity for people with disabilities to access employment (Title I), public services by local and state government (Title II), transportation (Title II & III), privately owned accommodations and services (Title III), and telecommunications (Title IV) operated by private entities. Miscellaneous provisions are listed in Title V (Access 1994).

American society has been aware of individuals within their communities with disabilities and as early as the 1840 census began canvassing some disabling conditions

(Goyer & Domschke, 1983). However, it was not until 1970 that the United States Bureau of Census began including work-related disabilities in its decennial census enumeration. Additional data on disabilities has been gathered periodically by the National Health Interview Survey (NHIS) between census enumerations (Census 1990 Summary Tape File 3A).

In a report from the Disability Statistics Rehabilitation Research and Training Center in 1992, Mitchell LaPlante describes the prevalence and causes of disability in the United States (LaPlante 1996). The information presented in that report was based on data collected by the National Center for Health Statistics (NCHS) through the NHIS. The numbers were based upon a recurring nationwide probability sample of households within the United States. LaPlante stated that approximately 15.0%, or 37.7 million people in the United States experience some limitations in their activities due to chronic health conditions. LaPlante's report revealed other interesting findings: 1) females were more likely to be limited in activities than males; 2) a correlation existed among educational attainment, family income, and disability; 3) educational attainment and family income are "inversely related to disability;" and 4) limitations were more prevalent in inner cities than the suburbs.

B. Research Problem Statement

Almost a decade has gone by since the passage of the ADA, and almost 30 years since the U.S. Bureau of the Census began enumerating work-related disabilities in its

decennial census. But have architectural barriers been removed allowing fuller access to the over 37 million disabled Americans, or 15% of the U.S. population? Studies between 1986 and 1994 have been equivocal and no studies have been done since 1994 to determine the effectiveness of the ADA.

This thesis examines the prevalence of architectural barriers and the level of compliance of the ADA within the metropolis of San Antonio through a systematic randomized sampling of small businesses within San Antonio. We will postulate that non-compliance to existing regulation is high and that it is closely related to several factors, mainly: 1) provisions exist only for monitoring new construction/alterations of buildings, 2) low awareness of the current recommended architectural designs, and 3) lack of awareness regarding shared responsibility for ADA compliance on the part of business and property owners.

II. COMMUNITY DESCRIPTION AND SCOPE OF THE PROBLEM

A. The Community

San Antonio, Texas, is a large metropolitan area encompassing most of Bexar County and includes several small incorporated towns which have been surrounded as the city has grown around them. Of more than one million people, San Antonio's population is composed of 36.2% White (non-Hispanic), 36.0% White (Hispanic), 6.8% Black (non-Hispanic), 0.3% Black (Hispanic), and 20.7% Other races. San Antonio has a higher percentage of its population with less than a high school education and living in poverty

than the nation as a whole (Table 1). According to LaPlante's findings, low educational attainment and a high poverty rate are associated with disability (LaPlante 1996). In addition, San Antonio has a relatively old population.¹ San Antonio shares problems similar to other metropolitan communities including crowding, pollution, and having to compete for limited resources. As with any aging society, chronic illness and disabilities are more prevalent (LaPlante 1996). Otherwise, the city shares common urban problems with other metropolitan communities including crowding, pollution, and city services competing for limited resources.

San Antonio is a large metropolis spread over a large land base. Thus, shared resources such as accessible parking and ramps are more difficult to achieve. More resources are required to accommodate the access needs. The cost to correct the current access problems is not small. Community lobbying is needed to compete for funds to

B. The Problem

The 1990 United States Census can be used to estimate the prevalence of disability in the San Antonio's adult population. Disability categories include: 1) work disabilities, 2) mobility limitations only, 3) self-care (activities of daily living) limitations only, 4) mobility or self-care limitations, and 5) mobility and self-care limitations. Because the disability is self-reported and categories are not mutually exclusive, the

FOOTNOTE

¹ The aged-child ratio (equal to population over age 65/population under 16) is 41 percent. Proportions greater than 30 percent reflect an aging society (Shryock et al. 1976).

disability prevalence rate varies depending on the categories utilized. Other sources of disability information, such as those gathered by the NCHS, are more detailed (LaPlante 1996). To avoid uncertain overlaps and the inadvertent overestimation of the number of disabled individuals, the total number of persons with disabilities in this paper is estimated only from the sum of the two mutually exclusive groups, a) mobility limitation only and b) self-care limitation only.

Table 1 illustrates the disability prevalence rates for the United States, Texas, and San Antonio for persons between the ages of 16 and 65 years. The percent of combined disability based on these two categories reveal that San Antonio has a higher rate (6.38%) when compared with the state (5.53%) and national rates (5.48%). While gender rates were similar among all three, the rate of poverty was higher in San Antonio (16.7%) and Texas (15.5%) than the nation as a whole (11.3%). Educational status also varied. The percentage of adults (between 25- 64 years) without high school diploma was higher in San Antonio and Texas (23.44 and 23.34%) than the nation (19.28%). Because these data exclude individuals over the age of 65, they do not accurately reflect the prevalence of disability in the communities. Table 2 illustrates disability prevalence rates in persons with advanced age. Unlike the 16-64 year age groups, disability rates are similar among San Antonio, Texas and the nation (30.6, 30.2, and 27.5%, respectively). The total poverty rate is again higher in San Antonio and Texas (17.2 and 18.4%) than the nation (12.8%).

Using the above estimates, San Antonio appears to have a physically disabled population between 2.6 and 6.4% for the 16-64 age group, and between 13.0 and 30.6% for the over 65 age group. The rates vary depending on the criteria used, i.e. mobility limitations, self-care limitations, or both. The overall disability prevalence rate is 9.7% excluding individuals under the age of 16 (Table 3). When this overall disability prevalence rate (9.7%) is compared with the national estimate of 15% (LaPlante 1996), San Antonio appears to have significantly fewer persons with disabilities. However, it is important to note that children under five years of age were excluded from LaPlante's study and children under 16 were excluded from the U.S. Census enumeration. Therefore, the above disability prevalence rates are underestimates.

To better approximate the prevalence of disability within San Antonio, we can attempt to supplement the above figures with estimates for the under 16 age group. In 1998, based on 4,035 Supplemental Security Income (SSI) recipients under age 18 in Bexar County, Chris Johnson estimated that five percent of children in Bexar County had severe disabilities (Johnson 1998). This estimate includes only children with severe disabilities who are members of families living at the near poverty level. When combined with the 1990 census data, the estimated prevalence rate is not significantly influenced and continues to approximate 9.7%. Multiple confounding factors, such as overlapping age groups, difference in geographic boundaries, data based solely on income (SSI), and difference in underlying enumeration time frame (1990 versus 1998) weaken this

estimate. Despite the difficulty in estimating the true prevalence of disability in San Antonio, it is a common problem.

C. The Environment

As mentioned above, San Antonio has a significant portion of its population (17%) in the lower socioeconomic group. This may be related to, or compounded by, the influx of people seeking a better way of life from the Texas-Mexico border where unemployment is high and fee for service is low. Historically, individuals from lower socioeconomic groups tend to have a lower educational attainment. According to LaPlante's findings (1996), this combination will result in higher disability rates in San Antonio.

Despite the ADA, San Antonio buildings and walkways are still inaccessible in many places. While handicapped parking can be seen throughout the city, many spaces do not comply with accessible parking designs that require at least five feet of clearance between vehicles to permit exiting/entrancing the vehicle [U.S. Dept. of Justice (USDOJ) FAX #3208]. Furthermore, van accessible parking spaces are frequently not available. A ramp should be nearby to allow disabled individuals to reach their final destination. Many times the ramps are not. If they are, they may be inappropriately sloped so that the person can potentially be stranded in the vehicle while his or her wheelchair rolls away (USDOJ 1997 J1.2: Am 3/14). If the ramp is directed into the oncoming traffic, the individual may roll into the path of motor vehicles and become injured. If the slope of

the ramp is too steep, the person may not be able to make the climb or descend safely.

Finally, the location of the ramp should not require the individual with disabilities to travel more than a “...marginally longer route” (USDOJ undated t2qa.txt).

Before reaching a final destination, an individual may meet other barriers including narrow, uneven paths and physical obstacles such as trash bins, steps, or difficult-to-open doors. The ADA Accessibility Guidelines for Building and Facilities (ADAGBF) do not currently require automatic doors to be provided by public or private entities, thus many buildings do not have automated doors (USDOJ 1998 Y3.B27: 8 Am 3/3). Entering a building can be a physically demanding challenge. This is particularly true when the door opens outward.

Once inside a facility, the disabled individual may have difficulty getting through narrow or partially blocked aisles or reaching objects on shelves. There may be insufficient space that limits one's ability to approach the information counter. Restrooms may not be large enough to negotiate a wheelchair. Handrails may not be present to assist the individual to avoid falling. Other common problems include inaccessible sinks or scald burns due to exposed hot water pipes.

Linda Pierce (1998) took a phenomenological approach and surveyed 4 men and 5 women who were non-ambulatory and dependent on a wheelchair for mobility. She attempted to describe the human experience as it was lived. Her goal was to achieve a better understanding and awareness of accessibility issues for people who must depend on wheelchairs for mobility. The findings revealed four common frustrations: 1) lack of

independence, 2) negative attitudes from bystanders toward people with disabilities, 3) lack of understanding and knowledge concerning accessibility issues by local citizens, and 4) lack of consumer involvement in designing of accessible facilities.

In their attempts to overcome these physical and emotional obstacles, persons with disabilities frequently experience increased fatigue, psychological inferiority, risk of injury, and lack of independence. As a result, they often opt to limit or isolate themselves from the community. However, the San Antonio Community has a great deal to offer.

Persons with disabilities do not need to be homebound. Obstacles can be overcome. Many disabled people have supportive family and friends who may be interested in providing community support to reduce the disparity of equal access for their loved ones with physical limitations. As noted above, the ADA prohibits discrimination against those who are physically disabled. There are many local organizations that can help overcome these obstacles. A few such organizations include: Children's Association for Maximal Potential (C.A.M.P.), United Way, Lion's Club, Association for Retarded Citizens (ARC) of San Antonio, Advocacy, Inc. – San Antonio, Council on Independent Living (C.O.I.L.), San Antonio's Area Disability Advocates (SAADA), San Antonio's Independent Living Services (S.A.I.L.S.), Goodwill Rehabilitation Services, Texas Rehabilitation Commission, San Antonio Area 20 Special Olympics, Disabled Adults for Social Alliance, Partnerships for Assisting Texans with Handicaps (P.A.T.H.), and Parent Information Exchange (P.I.E.).

III. AMERICANS WITH DISABILITY ACT OF 1990

While the ADA is a law, it is also an obscure 41-page document. As a legal document, it is not written for the general public. Like many laws, the concepts are clear, but the logistics needed to implement the law are vague. While this may be intentional to permit flexibility in its implementation, vagueness also permits differences in interpretation. The majority of persons with disabilities are not familiar with the law (West 1995). Finally, enforcement is passive (Access 1994). Individuals are required to file a complaint or a lawsuit before a violation receives adequate attention. This aspect has already overburdened US Attorney General's Office (West 1995). The only viable and routine ADA enforcements are the citations issued by police for parking in a handicapped space without the appropriate tag or placard. However, enforcement of this regulation is hindered by the inappropriate issuance of handicap tags to non-disabled persons. The documentary television program 20/20 reported this to be a problem in several major cities around the United States.

Since this paper addresses inequalities to San Antonians with physical disabilities relating to public access, only Title II and Title III of the ADA will be discussed. Important definitions of terms used in the ADA are attached (Appendix 1) to facilitate understanding of the law.

Section 201 (1) – (5) of the ADA, Title II, addresses access to public services. It is worded in such a way that layman may have difficulty interpreting it. It states that disabled individuals shall not, "by reason of such disability," be excluded from

participation in programs or services. The enforcement of this Act refers to Section 505 of the Rehabilitation Act of 1973 (29 U.S.C. 794a). Depending upon the type of infraction, the individual must file his/her complaint with one of eight possible federal overseeing agencies. Since the regulatory portion of the ADA has been tasked to the US Attorney General, the disabled individual must file his/her complaint directly with the Department of Justice, Civil Rights Division. Attaining due process through a lawsuit is a second alternative.

Section 301 (1) – (10) of the ADA, Title III, addresses public accommodations and services operated by private entities. It states that “no individual shall be discriminated against on the basis of disability in the full and equal enjoyment of the goods, and service.” While Title III adequately lists those services regarded as “public accommodation,” it is not written in terms readily understood by the general public. Title III, specifically prohibits the “...failure to remove architectural barriers...” so that “...no individual with a disability is excluded...or, denied services.” However, the descriptions for “new” construction and alterations in public accommodations and commercial facilities are vague. It states that “...design and construction for facilities 30 months after the enactment of the ADA must be readily accessible...,” but further qualifies the statement with “...except where an entity can demonstrate that it is structurally impracticable to meet the requirement.” Regarding facilities that must be “altered” to meet this requirement, it again provides a loop-hole by stating “...to the maximum extent feasible.”

While the intent of the ADA is to provide flexibility as communities transition to a barrier free society and persons with disabilities enjoy equal access, the vagueness fosters non-compliance by allowing differences in interpretation. The enforcement of the ADA, Title III, is subjected to the remedies and procedures set forth in Section 204 (a) of the Civil Rights Act of 1964 [42 U.S.C. 2000a – 2 (a)]. Due process is similar to that of Title II. The individual must file a complaint or lawsuit. As the designated enforcement agency, the US Attorney General's Office is tasked to investigate, mediate, and commence civil action in appropriate situations. Monetary awards may be granted to “...vindicate the public interest, assess a civil penalty against the entity” up to but “not exceeding \$50,000 for a first violation; and not exceeding \$100,000 for any subsequent violations.”

Many citizens including business owners, government personnel, and laymen alike have misinterpreted the ADA as special privileges, not equal rights for individuals with disabilities. Clarifications to the ADA are available on the Internet at <http://www.usdoj.gov>, as well as other sources (see reference list). According to “Myths and Facts about the ADA” (USDOJ undated, FAX #3105), the ADA is based on “common sense.” Removal of architectural barriers in existing facilities is required “...when it is readily achievable...without more difficulty or expense.” If this cannot be achievable, “curbside service” is acceptable. Businesses are encouraged to develop a long-term plan for barrier removal. Additionally, “ADA requires all government “...programs...*not* government buildings...” be accessible. While this statement allows

flexibility in the allocation of resources, it provides a loophole, whereby nothing may be done.

Additional clarification for the ADA is available from "Common Questions about Title II of the ADA" (USDOJ undated, t2qa). It states that "...a public entity does not have to take any action that...would result in a fundamental alteration in the nature of its program or activity or in [sic] undue financial and administrative burden." With recent budget cutbacks, "undue financial burden" provides another reason for state or local governments to ignore the ADA.

Further delays in barrier removal occurred in 1995 when the Department of Justice amended the regulation calling for the implementation of Title II of the ADA (USDOJ 1995) to "...clarify the requirement for installation of curb ramps at existing pedestrian walkways." As of November 1995, the deadline for compliance with providing curb ramps in state and local public facilities was extended to 26 January 1998. The deadline for providing curb ramps in other existing pedestrian walkways has been extended to 26 January 2005.

Laws may dictate intent, but they require interpretation before they can be implemented. Many Department of Justice documents have been published to guide public and private entities. These documents have been specifically scrutinized for barrier removal issues. The ADA Title II and III have vaguely addressed access to public bathrooms, telephones, and drinking fountains (Access 1994). No specific guidelines were given for ramps and accessible doors. The ADA authorizes the Department of

Justice to publish guidelines for the purpose of providing technical assistance. Each guideline carries a disclaimer stating that “this technical assistance does not constitute a legal interpretation of the statute.” Such guidelines include the “Americans with Disabilities Common Questions: Readily Achievable Barrier Removal, Design Details: Van Accessible Parking Spaces” (USDOJ 1996, ADA TA Number 1) and the “ADA Guide for Small Businesses” (USDOJ 1996, J1.8/2: D63). Other more formal guides, such as: “ADA Title II Technical Assistance Manual” (USDOJ 1992, J1.8/2: Am3/title2), “ADA Title III Technical Assistance Manual” (USDOJ 1992, J1.8/2: Am3/title3), and their supplements (USDOJ 1994/taman2up and taman3up) describe numerous techniques to accomplish barrier removal. In “Common Questions about Title II of the ADA” (USDOJ undated, t2qa), it states that curb ramps may “...not necessarily (be) required at every point where a pedestrian walkway intersects a curb.” Alternative routes may be offered as long as individuals with disabilities are only required to “...travel a marginally longer route.” Ramps should be provided in all the streets, roads, or highways that are newly constructed or altered. Furthermore, the inclusion of terms such as “if readily achievable,” “if possible without undue burden,” etc. gives the impression that the *law is merely* a recommendation. Finally, by deferring barrier removal deadlines (i.e. curb ramps), the government inadvertently downplays the significance of the ADA.

Jane West has summarized progress in the implementation of the ADA during its first 4 years in her report, “Federal Implementation of the Americans with Disabilities Act, 1991–94.” According to West, the Federal government has put forth great effort to

implement the ADA, however it has lacked a comprehensive strategy regarding enforcement, technical assistance, and public awareness. Furthermore, by mid-1994, the Department of Justice had received 2,649 complaints concerning public accommodations and another 2,714 complaints of discrimination by state and local governments. Sixty-two percent of the complaints were related to barrier removals. More importantly, approximately 40% of the complaints had not been addressed ("opened") due to staff shortages. Individual whose complaints were addressed had to contend with long and variable bureaucratic processes that averaged 98 days (2 to 456 days). Furthermore, West states that only 41% of Americans (versus 92% of businesses) are even aware of the ADA. However, the above estimate (re: the number of complaints) may be grossly underestimated since many are voiced only at the local establishment and never progress to the Justice Department.

In addition to implementation of the ADA, "enforcement" is required if the law is to be effective. Associated with this is the appropriate funding to enhance its success. Finally appropriate funding must be allocated to ensure that both implementation and enforcement take place. Due to limited funding only those complaints which: 1) clearly demonstrate an existing problem, 2) rally community involvement, and 3) effectively communicate the existing problem will achieve resolution with the appropriate government agencies.

IV. PREVALENCE OF ARCHITECTURAL BARRIERS

Many published literatures regarding architectural barriers address compliance issues relating to the ADA. Studies performed by the Architectural and Transportation Barriers Compliance Board (ATBCB) have been limited to anthropometric studies. Structural recommendations are made so that the "average" person can successfully access and use a given facility. Guidelines for inspections of both new buildings and alterations of existing buildings ensure compliance with the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities" (USDOJ 1998).

Few studies address the prevalence of architectural barriers within communities. Karin Roberts (1986) presented results from an Architectural Barrier Lab performed by nursing students at a shopping mall. In this study, nursing students using a wheelchair attempted to access various mall shops. These students identified architectural barriers, described public reactions to their efforts, and proposed solutions. Among the barriers identified were: heavy entrance doors, carpeting, elevators located in back of department stores, obstructed access to elevators, small dressing rooms, narrowed aisles, non-revolving circular racks, high shelves, slick ramps, double doors to restrooms, and poorly adapted restrooms. Although the barriers were listed, they were not quantified. Societal reactions ranged from frank staring, pointing, and overreaction to ignoring the individuals.

In 1992, Robert Couch also studied shoppers in an urban mall, but used a different approach. He investigated shopper preference in choosing steps versus a ramp to ascend

or descend a 5-foot elevation. Sixty-five percent of 3,554 shoppers chose the ramp. Couch described other non-disabled groups who benefited from ramps, such as parents with babies in strollers.

Food establishments were also studied. Linda McClain & Christy Todd (1990) evaluated and compared accessibility compliance among 20 grocery and convenience stores in both urban and rural settings. Eight accessibility issues were measured: parking, ramps, curbs, entrances, aisles, telephones, shopping baskets, and restrooms. A scoring system was used where 38 points were equal to 100% accessibility. Grocery stores were found to have significantly higher compliance rate for parking, ramps, curbs, and accessible entrances. The mean score for the grocery store was 29.1/38 (76% accessible), whereas the convenient store scored an 18.2/38 (47.9% accessible). A follow-up study was performed six months after letters were sent to notify the stores of their deficiencies. Only 25% of the stores contacted had made changes in specific deficient areas.

Wheelchair accessibility in restaurants was studied by Linda McClain et al. in 1993. One hundred-twenty restaurants were evaluated including equal numbers of rural and urban fast food and conventional restaurants. The most common obstacle to dining out was inaccessible parking. Only 53% of the 120-sites provided handicapped parking. The second most common obstacle was the absence of ramp and the severity of ramp incline. Other barriers to accessibility included inadequate accommodations in the restrooms, knee clearance at the table in the dining room, and difficulty negotiating aisles between tables. According to McClain et al., these environmental barriers may result in

individuals experiencing frustration, embarrassment, humiliation, and even total denial of services.

Helen Ahn et al (1994) studied physical barriers among businesses in a small urban community. Surveys of 250 businesses demonstrated that only 27% of businesses lacked architectural barriers. Common barriers for individuals with disabilities were interference with parking and entrance (65%), restrooms (42%), and poor access to goods & services (40%).

Studies of public buildings were less common. Linda Martin (1987) surveyed 13 public buildings in Utica, New York, demonstrating lower access compliance (55%) in buildings built in the 1960s compared with those built in 1980s (97%). Improvement in accessibility was attributed to the enactment of the Rehabilitation Act of 1973; however non-compliance persisted in the areas of parking, doorways, ramps, and public restrooms.

Nine years have passed since the ADA has been signed into law. Since 1994, no additional studies have been published evaluating the prevalence of architectural barriers within the community. Despite numerous changes to the laws, increased social acceptance of disabled individuals, our communities continue to have obstacles that prevent equal access by individuals with disabilities.

V. RESEARCH QUESTION

What is the prevalence of architectural barriers within the community and compliance relative to the ADA? The purpose of this study is to measure the frequency

of architectural barriers in small businesses within San Antonio and to determine the extent of compliance with the Americans with Disabilities Act of 1990.

VI. METHODS

Facilities

A comprehensive list of businesses were obtained from the Business White Page portion of the *October '98/'99 Southwestern Bell Greater San Antonio Yellow Pages*. From this list, a total of 200 small businesses were selected using a systematic randomized sampling process. The operational definition for a "small business" in this study was one in which the business requires the customer to come to the business location to acquire services or goods. Businesses that operate in "chains" were limited to one per chain, if selected.

The Business White Pages contains 260 pages of businesses. Each page contains four columns of business listings. Using the Minitab Version 12 for Windows 95 statistical program, three random numbers were generated: 1) a number between 1 and 260 for the starting page, 2) a number between 1 and 4 for the starting column, and 3) number between 1 and n (where n is the number of businesses in the selected column). The three numbers generated above identified the starting point for the businesses to be sampled. Subsequent businesses were systematically acquired by moving 6 columns to the right and down that column by the third random number generated above. Upon reaching the last business in a column, the next business in sequence was at the top of the adjacent right column. Similarly, when the last page was reached, the list cycled back to

the first page until all 200 small businesses were identified. The businesses were assigned a numeric code to insure confidentiality.

Instrument

The survey used in this study was designed using the guidelines published in the *Americans with Disabilities Act Accessibility Guidelines for Building and Facilities*. The survey comprises eight areas: 1) building construction or last alteration relative to 1990, 2) handicapped parking, 3) ramps, 4) doors/entries, 5) restrooms, 6) telephones, 7) water fountains, and 8) other physical barriers (Appendix 2).

A letter of information was mailed to each business approximately three weeks prior to the survey (Appendix 3). The letter informed the business owner or manager of the researcher's intent and requested permission to perform the survey. Participation in the study was voluntary. Businesses were contacted by telephone 1 to 2 days prior to the survey. Willingness to participate in the survey was determined at that time. Five attempts were made to contact the business manager or owner prior to determining them "unreachable." All businesses wishing to decline were honored. If approval was unobtainable through the mail and telephone, the business was not surveyed. Businesses failing to meet the study definition for a "small business" were not surveyed. The author performed all of the mailings, telephone calls, and site surveys.

Building Construction: The determination of building construction or alteration dates relative to 1990 was made through verbal questioning of business owners or

managers. When no alterations had been made to the existing building and the building construction date was reportedly unknown, the age of the building was estimated by the structure's design and age of neighboring buildings.

Handicapped Parking: Parking spaces were enumerated within the business area using the following criteria: 1) Parking spaces separated by natural or man-made dividers were treated as distinct parking areas. 2) All parking spaces were counted whenever feasible. 3) When a business complex had multiple parking areas and decentralized handicapped parking, only the closest parking area to the business selected was included in the survey. 4) When handicapped parking spaces were centralized, all parking spaces were enumerated. Parking areas and walkways were deemed "level" when minimal or no grade was observable.

Measurements involving distances less than 5 feet were made with a retractable metal measuring tape, whereas distances over 5 feet were made with a Rolatape® (Appendix 4). Measurements were rounded to the nearest $\frac{1}{4}$ inch.

Ramps: Distances between parking, ramp, and businesses were measured as follows: 1) The measurements began at the midpoint of the yellow striping for the parking space closest to the ramp and ended at the base of the ramp. 2) The distance between the ramp and the business began at the base of the ramp and ended at the exterior door. 3) The parking to business measurement was established by taking the sum of the above two measurements. Grading of ramps and walkways were determined to be greater than or less than 1:20 using a specially designed level (Appendix 5).

Doors: The force (pound pressure) needed to open the exterior door was measured using a Zebco Fisherman's De-Liar (Model 228) (Appendix 4). The De-Liar's calibration was verified by comparing its measurements of standardized weights. Measurements were rounded up to the nearest $\frac{1}{2}$ pound. A force greater than 8.5 (pound pressure) needed to open the exterior door was considered to be excessive. Businesses with automatic doors or doors left propped open for the duration of the business hours were excluded. Exterior doors were observed to meet the minimum width of 32 inches. If the criterion was met, no width dimensions were documented. Thresholds were measured to the nearest $\frac{1}{4}$ inch. Measurements greater than $\frac{1}{2}$ inch were documented.

Rest Rooms: Public restrooms were evaluated for the presence of: 1) handicapped stalls, 2) support rails, 3) sink pipe insulation, and 4) accessibility of the sinks, mirrors, and paper towel dispensers/dryer. Mirrors and paper towel dispensers/dryers were deemed to be adequate when the lowest usable edge was less than or equal to 40 and 54 inches from the floor, respectively. The dimensions of the stalls were measured to the nearest $\frac{1}{4}$ inch. Presence or absence of the universal handicap sign was documented. Maneuverability within public restrooms was determined by the ability to manipulate a standard adult-sized wheelchair within the stall. Maneuverability was determined to be adequate when the handicapped stall permitted enough room to manipulate a wheelchair along side the toilet seats without obstruction.

Telephones: Public telephones were determined to be of adequate height when the highest operable part of the telephone was less than or equal to 48 inches from the floor.

Water fountains: Water fountains were determined to be of adequate height when the spout outlet was no higher than 36 inches from the floor. Additional accessibility barriers, such as inadequate knee space, were noted only when the height requirements were met.

Other Physical Barriers: Additional barriers encountered during the site survey not previously identified were itemized.

Analysis

Descriptive statistics were used to determine the prevalence of architectural barriers within the San Antonio community and the level of compliance to the Americans with Disabilities Act of 1990 based on the recommendations published in the *Americans with Disabilities Act Accessibility Guidelines for Building and Facilities*. The proportion of small businesses meeting each of the above accessibility criterion was tallied and converted to percentage. Similarly, the proportion of businesses failing to meet accessibility recommendations was tallied and converted to percentage. All guidelines within an area (parking, ramp, etc.) must be met for a business to be scored as being in compliance. The means and standard deviations were calculated for all continuous data measured.

VII. RESULTS

From the two hundred small businesses randomly selected, seven businesses were unreachable by mail or telephone. As a result, they were determined to be no longer in business. Thirty-four business owners or managers were unreachable by telephone for survey approval. Six businesses did not meet the study definition for small business. Thirty-two businesses declined to be surveyed. As a result, 121 (60.5%) of the 200 selected businesses were surveyed in this study (Table 4).

The majority of the randomly selected businesses in San Antonio did not comply with the Americans with Disability Act. Only 4/121 (3.3%) of the businesses had no architectural barriers. Architectural barriers were noted as follows: 1) inadequate or inaccessible parking (86.0%), 2) ramps (70.2%), 3) doors/entry ways (70.2%), 4) public restrooms (88.2%), 5) telephones (50%), 6) water fountains (51.6%), and 7) other fixed/movable barriers (71.9%) (Table 5).

Eighteen (14.9%) of the 121 sites surveyed were constructed or altered after 1990. Among these 18 businesses, 3/18 (16.7%) had no deficient areas, 5/18 (27.8%) had one, and 10/18 (55.5%) had two or more deficient areas. For businesses constructed or altered prior to 1990, 1/103 (1%) had deficient areas, 3/103 (2.9) had one, and 99/103 (96.1%) had two or more deficient areas (Table 6).

Evaluation of handicapped parking revealed 17/121 (14%) businesses met all requirements. Thirty-six of 121 businesses (29.8%) had no handicapped parking available and 68/121 (56.2%) had discrepancies in one or more areas. The most common

discrepancies were inadequate number of handicapped parking spaces, 58/68 (85.3%), inadequate access aisle or striped spacing adjacent to parking spaces, 57/68 (83.8%), and inadequate van accessibility, 48/68 (70.6%) (Table 7). The mean number of parking spaces was 53.1 with a standard deviation of 121.5 (range = 0 to 828). The mean number of handicapped parking spaces was 2.8 with a standard deviation of 7.7 (range = 0 to 57). The mean distance from handicapped parking to ramp was 18 feet with a standard deviation of 16.9 feet (range 0 – 78.1). The mean distance from handicapped parking to the business was 73.8 feet with a standard deviation of 67.2 feet (range = 6.3 to 477.8). The mean width of access aisle (striped spacing) was 6 feet with a standard deviation of 5.7 feet (range = 0 to 31.8) (Table 8).

Evaluation of ramps and walkways revealed 36/121 (29.8%) businesses met all requirements. Three of 121 businesses (27.3%) had no ramps available and 52/121 (43.0%) had discrepancies in one or more areas. The most common discrepancies were excessive ramp grading, 49/52 (94.2%), unleveled ramps projecting into access aisles, 26/52 (50%), and ramps crossing path without grade or flare protection, 24/52 (46.2%) (Appendix 6) (Table 7). The mean distance from the ramp to the business was 52.1 feet with a standard deviation of 63.5 feet (range = 4.3 to 469.8) (Table 8).

Evaluation of doors and entryways revealed 36/121 (29.8%) businesses meeting all requirements and 85/121 (70.2%) had discrepancies in one or more areas. The most common discrepancies were difficult to open or heavy doors, 74/85 (87.1%), followed by exterior door threshold exceeding $\frac{1}{2}$ inch, 21/85 (24.7%) (Table 7). For the exterior

doors, the mean force (pound pressure) was 10.2 pounds with a standard deviation of 3.5 pounds (range = 2 to 21) (Table 8).

Fifty-one (42%) of the 121 businesses provided public restrooms. Evaluation of these restrooms revealed 6/51 (11.8%) businesses meeting all requirements while 45/51 (88.2%) businesses had discrepancies in one or more areas. Twenty-one (46.7%) of the 45 businesses offering public restrooms provided no handicapped stalls. The most common discrepancies among businesses offering handicapped restrooms were the absence of the universal handicap sign, 20/24 (83.3%), inadequate maneuverability, 12/24 (50%), absence of sink pipe insulation, 11/24 (45.8%), and 4) excessive towel dispensers/dryers height, 11/24 (45.8%) (Table 7). The mean restroom dimensions are as follows: 1) width was 4.7 feet (standard deviation = 1.9, range = 2.5 to 11.3) and 2) depth was 6.2 feet (standard deviation = 1.9, range = 3.0 to 11.0). The mean handicapped restroom dimensions are as follows: 1) width was 5.3 feet (standard deviation = 0.3, range = 3.0 to 11.3) and 2) depth was 6.9 feet (standard deviation = 1.8, range = 4.0 to 11.0) (Table 8).

Fifty (41.3%) of the 121 businesses provided public telephones. Evaluation of these telephones revealed 25/50 (50%) had inadequate height where the highest operable part of the telephone was over 48 inches from the floor (Table 5).

Thirty-one (25.6%) of the 121 businesses provided water fountains for public use. Evaluation of these water fountains revealed 16/31 (51.6%) had inadequate height where the spout outlet was higher than 36 inches from the floor (Table 5).

One hundred thirty-four additional obstacles were encountered during the business surveys; 87 (64.9%) were fixed barriers, 43 (32.1%) were movable barriers, and 4 (3.0%) were other barriers. The most common fixed barriers were steps, 33/87 (37.9%) and uneven paths, 26/87 (29.9%). The most common movable barriers were store displays, 21/43 (48.8%), placed so that the access aisle is reduced to less than 32 inches. Other barriers identified were heavy vehicular traffic at the handicapped parking or ramp sites, 4/4 (100%) (Table 9).

VIII. DISCUSSION

The findings of this survey reveal significant architectural barriers within the San Antonio community. Only 3.3% of the San Antonio businesses surveyed were in completed compliance with the ADA, lacking any architectural barriers. The proportions of businesses that were fully compliant for the specific areas were: 1) handicapped parking, 14%, 2) ramps, 29.8%, 3) doors/entryways, 29.8%, 4) public restrooms, 11.8%, 5) telephones, 50%, 6) water fountains, 48.4%, and 7) other barriers, 28.1%.

McClain & Todd's study in 1990 attempted to include distance from handicapped parking spaces to the business entrance. An arbitrary distance of 30 feet was used as a reasonable distance to travel from parking to services. McClain & Todd's article did not discuss actual distances, but rather if the business met or did not meet the 30 feet criteria. The *Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities* provides no specific recommendations in regard to distance of handicapped parking to

ramps and businesses. No previous studies have included this parameter in the past. Since the 30 feet criteria in McClain & Todd's study was set arbitrarily and no reference data is available, data was gathered in the current study to determine these distances. The findings from this study revealed the mean distance from handicapped parking to the business was 73.8 feet with a standard deviation of 67.2 feet (range 6.3 – 477.8). The mean distance from handicapped parking to the business in this study suggests that the 30 feet criteria in McClain & Todd's study may have been too strict. However, with the maximum distance from handicapped parking to business being 477.8 feet, future anthropometric studies in this area may be beneficial.

The majority of the handicapped restroom stalls were grossly inadequate. Many of these stalls appeared to be quick attempts to be in compliance with the ADA by adding support rails and modifications in stall doors. One interesting finding relates to the maneuverability within the stall. According to the *ADA Accessibility Guidelines for Buildings and Facilities*, the stall should measure no less than 60 inches in width and 56 inches in depth. Our survey revealed three businesses in which the handicapped restroom stall met the above measurement criteria, but still lacked maneuverability due to the location of the toilet and/or the door. These concerns may have been identified since two of the businesses surveyed, built within the last year, had handicapped restroom stalls measuring 72 inches by 84 inches and 89 inches by 132 inches, significantly larger than previously recommended.

Limited access due to heavy or difficult to open exterior doors has been commented on by several researchers, Roberts (1986), Martin (1987), Ahn (1994), but no studies have quantified the opening force required. The current recommendation for the maximum force for door opening or closing the exterior doors is 8.5 pounds. The findings of this survey revealed the mean force for door opening was 10.2 pounds with a standard deviation of 3.5 pounds (range 2 – 21). Forty-one of 74 (55.4%) businesses had doors requiring greater than 10 pounds of force to open. Ten businesses had doors requiring greater than 15 pounds of force to open.

Since business owner or manager approval was required for this survey to be performed, bias favoring compliance was anticipated in the results. To encourage participation in this study, the randomly selected small businesses were offered a copy of their business' evaluation, recommendations (Appendix 7), available resources (Appendix 9), and a complimentary copy of the *Accessibility Manual* (1995).

However, from the above compliance results, a bias favoring compliance did not appear to be the case. Comments by business owners and managers encountered during this survey had four recurring themes. First, the business owner or manager reported being covered by a *grandfather clause*. As a result, the business was *exempt from the ADA*. No such grandfather clause or exemption exists. Second, *someone else* owned the property. The business owners and managers felt strongly that any alterations are the responsibility of the property owner and thus exempted from the ADA. Under the ADA, the business and property owners share the responsibility for access. Third, the *parking*

lot is shared. Business owners are reluctant to invest in the alteration of common areas. Fourth, they have *no handicapped customers.* The business owners voiced making alteration *if* they had a handicapped customer. Without access, the business will most likely continue to lose business from customers with disabilities.

Among businesses surveyed attempting to comply with the ADA, it was evident that the current recommendations were not always known or understood. Designated handicapped parking spaces at many businesses consisted of the universal handicapped sign painted onto a regular parking slot without regards to location, width, or access aisles. Striped spacing adjacent to handicapped parking spaces when present was noted to be of inconsistent or inadequate widths. Van accessible space signs were occasionally placed at spaces too narrow, while the wider space lacked the appropriate sign. Narrow, steep, or uneven ramps were frequently found. Support rails were placed in regular restroom stalls to make them handicapped accessible. These businesses fail to comply with the ADA due to their lack of knowledge on the current recommendations.

An alternative is noncompliance through action. Many of the businesses surveyed demonstrated compliance through correct *structural* configuration, yet *opting* to place or store items in the access area. One business placed their trash receptacle in the handicapped parking access area. Two businesses used their handicapped restroom stalls to store large boxes. Twenty-one businesses placed sales displays in the aisles, thus making the aisle inaccessible. Two businesses were configured in such a way that when their delivery trucks were parked, it blocked all of the handicapped parking and access

aisles. Since building inspections are only performed after new building constructions or alterations, access concerns such as these are not anticipated.

Comparisons of the results from this study to previous studies were difficult (Table 10). The guidelines for accessibility have changed markedly over time as a result of anthropometric studies performed by the Architectural and Transportation Barriers Compliance Board and with improvement in technology/design. The latest recommendations published in 1998 were used in this study. Other comparison difficulties were due to differences in study design and scoring requirements for compliance consideration. ADA compliance among education and income areas were not factors due to the universal nature of noncompliance among all businesses (Appendices 10 – 12).

Compliance by building construction/alterations relative to 1990 showed relatively fewer deficiencies than buildings constructed or altered after 1990. The data for these comparisons may vary slightly because many of the construction/alteration dates were estimated, rather than known. However, the fewer architectural barriers within buildings constructed/ altered after 1990 were not unexpected since the ADA is enforced through building code inspections conducted after new construction and alterations. No enforcement occurs for existing buildings unless a formal complaint is filed with the US Attorney General's Office. Relative compliance by actual date of construction/alteration may be more informative. However, no electronic database is available for information regarding building construction/alterations. Confirmation

requires knowledge of the business sites' lot number, not the address, to manually retrieve the information from city records.

Martin (1987) reported 15.4, 46.4, and 7.7% of buildings in Utica, New York, were compliant in the area of handicapped parking, doors/entryways, and public restrooms, respectively. While Martin's results were similar to the findings in the current study, his data represented a composite of 13 higher education facilities, governmental agencies, and retail business complexes. Comparison between the current study and Martin's results is not appropriate since governmental buildings were not included in the current study.

McClain & Todd (1990) presented their data on an overall point scale of 0-38. The range for mean scores was 18.2 to 29.1. Conversion to percentage of accessibility, where 38 points equal 100% accessibility, suggested an access compliance range of 47.9 to 76.6%. However, no differentiation was made among the various areas evaluated.

McClain et al (1993) reported compliance in the area of handicapped parking, ramps, and restrooms at the rate of 53, 66, and 60%, respectively, however compliance was based on the presence of a designated parking space, ramp, or stall. There was no requirement to meet all standards.

Ahn et al (1994) reported 27% of the businesses in their study were in full compliance. Among businesses with architectural barriers, the proportion of compliance in the areas of parking and entrance, goods and services, and restrooms were 35, 60, and

58 %, respectively. Since the scoring process was unclear and differentiation among the areas evaluated was not made, comparisons cannot be performed.

IX. CONCLUSIONS

Studies involving prevalence measurements within the community are sparse. Enforcement of the ADA has been passive and compliance monitoring has been limited to new construction and building alterations. Physical barriers limiting access for individuals with disabilities persist as a significant problem in San Antonio despite the passage of the ADA in 1990. Numerous reasons account for this failure including lack of enforcement of ADA guidelines in existing buildings, insufficient understanding of these requirements by business owners/managers and property owners, and failure of the public to demand implementation.

San Antonio small businesses are in great need of technical and financial assistance to transform the city into an architectural barrier-free society. Current leaders must compete for limited local, state, and federal funding to solve community problems including those that address physical access for persons with disabilities. Partnership between the businesses, Disability Access Office/City Planning Office, and the numerous organizations that support individuals with disabilities within San Antonio need to be fostered to create the required momentum to free all the physical disabled from societal handicaps.

Tables

Table 1 - Person Reporting Disability By Type of Limitations: U.S., Texas, and San Antonio (1990)
Age 16 - 64

Area and Characteristics	Total Population		Disabilities					
			Total		Mobility Limitation Only		Self-care Limitation Only	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
United States:								
Age								
16-64	157,323,922		8,636,570	5.49	3,252,631	2.07	5,383,939	3.42
Gender								
Male	76,669,407	48.73	4,203,387	5.48	1,565,915	2.04	2,637,472	3.44
Female	80,654,515	51.27	4,633,183	5.74	1,886,716	2.34	2,746,467	3.41
Income								
Universe	155,351,173		8,818,373		3,445,785		5,372,588	
<1.00 Poverty	17,559,439	11.30	2,289,864	25.97	1,004,891	29.16	1,284,973	23.92
<1.25 Poverty	23,057,319	14.84	2,895,595	32.84	1,276,337	37.04	1,619,258	30.14
Education								
(age 25-64)	125,458,312		7,639,720		3,119,663		4,520,057	
< High School	24,188,085	19.28	3,436,955	44.99	1,547,210	49.60	1,889,745	41.81
Texas:								
Age								
16-64	10,695,826		591,291	5.53	227,495	2.13	363,796	3.40
Gender								
Male	5,239,272	48.98	285,624	5.45	105,772	2.02	179,852	3.43
Female	5,456,554	51.02	305,667	5.60	121,723	2.23	183,944	3.37
Income								
Universe	10,602,938		590,467		227,218		363,249	
<1.00 Poverty	1,653,921	15.46	189,309	32.06	80,834	35.58	108,475	29.90
<1.25 Poverty	2,154,919	20.15	235,874	39.95	99,868	43.95	136,006	37.40
Education								
(age 25-64)	8,434,480		507,248		204,145		303,103	
< High School	1,968,730	23.34	246,838	48.66	106,774	52.30	140,064	46.21
San Antonio:								
Age								
16-64	795,153		50,749	6.38	20,286	2.55	30,463	3.83
Gender								
Male	377,617	47.49	24,152	6.40	9,233	2.45	14,919	3.95
Female	417,536	52.51	26,597	6.37	11,053	2.65	15,544	3.72
Income								
Universe	790,800		50,743		20,286		30,457	
<1.00 Poverty	131,714	16.66	16,840	33.19	7,386	36.41	9,454	31.04
<1.25 Poverty	173,222	21.90	20,659	40.71	8,993	44.33	11,666	38.30
Education								
(age 25-64)	625,105		43,949		18,242		25,707	
< High School	146,539	23.44	21,175	48.18	9,190	50.38	11,985	46.62

Source: Disability 1990 Census. <[Http://www.census.gov/hhes/www/disable/census.html](http://www.census.gov/hhes/www/disable/census.html)>

Table 2 - Person Reporting Disability By Type of Limitations: U.S., Texas, and San Antonio (1990)
Age 65 and Over

Area and Characteristics	Total Population		Disabilities					
			Total		Mobility Limitation Only		Self-care Limitation Only	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
United States:								
Age								
65 and Over	29,563,511		8,136,004	27.52	4,611,920	15.60	3,524,084	11.92
Gender								
Male	12,087,478	40.89	2,669,051	22.08	1,386,793	11.47	1,282,258	10.61
Female	17,476,033	59.11	5,466,953	31.28	3,225,127	18.45	2,241,826	12.83
Income								
Universe	29,562,544		8,135,939		4,611,899		3,524,040	
<1.00 Poverty	3,780,585	12.79	1,676,668	20.61	967,617	20.98	709,051	20.12
<1.25 Poverty	5,877,165	19.88	2,511,487	30.87	1,453,167	31.51	1,058,320	30.03
Texas:								
Age								
65 and Over	1,615,616		488,317	30.22	276,742	17.13	211,575	13.10
Gender								
Male	666,244	41.24	161,994	24.31	85,682	12.86	76,312	11.45
Female	949,372	58.76	326,323	34.37	191,060	20.12	135,263	14.25
Income								
Universe	1,615,525		1,057,206		276,736		211,575	
<1.00 Poverty	296,690	18.36	302,059	28.57	80,758	29.18	59,434	28.09
<1.25 Poverty	424,062	26.25	377,130	35.67	110,169	39.81	81,225	38.39
San Antonio:								
Age								
65 and Over	126,016		38,604	30.63	22,174	17.60	16,430	13.04
Gender								
Male	51,613	40.96	12,980	25.15	6,970	13.50	6,010	11.64
Female	74,403	59.04	25,624	34.44	15,204	20.43	10,420	14.00
Income								
Universe	125,995		38,604		22,174		16,430	
<1.00 Poverty	21,632	17.17	10,522	27.26	6,124	27.62	4,398	26.77
<1.25 Poverty	30,295	24.04	14,357	37.19	8,274	37.31	6,083	37.02

Source: Disability 1990 Census. <[Http://www.census.gov/hhes/www/disable/census.html](http://www.census.gov/hhes/www/disable/census.html)>

Table 3 - Person Reporting Disability By Type of Limitations By Age for San Antonio (1990)

Age	Total Population		Disabilities					
			Total		Mobility Limitation Only		Self-care Limitation Only	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
16-34	390,138	42.35	17,344	4.45	5,442	1.39	11,902	3.05
35-54	306,097	33.23	20,580	6.72	8,510	2.78	12,070	3.94
55-64	98,918	10.74	12,825	12.97	6,334	6.40	6,491	6.56
65-69	46,703	5.07	8,084	17.31	4,209	9.01	3,875	8.30
70-74	33,057	3.59	7,523	22.76	4,155	12.57	3,368	10.19
75-79	23,122	2.51	8,295	35.87	4,935	21.34	3,360	14.53
80-84	13,953	1.51	7,094	50.84	4,329	31.03	2,765	19.82
85 and over	9,181	1.00	7,608	82.87	4,546	49.52	3,062	33.35
Total	921,169	100.00	89,353	9.70	42,460	4.61	46,893	5.09

Source: Disability 1990 Census. <[Http://www.census.gov/hhes/www/disable/census.html](http://www.census.gov/hhes/www/disable/census.html)>

Table 4 - Proportion of Surveys Completed Among Randomly Sampled Small Businesses in San Antonio (March - April 1999)

Businesses	Number	Percent
Randomly Selected	200	100
Surveys Completed	121	60.5
Surveys Not Completed:	79	39.5
Declined	32	40.5
No longer in Business or Unable to Obtain Approval by Manager/Owner	41	51.9
Did not meet Study Criteria for Small Business	6	7.6

Table 5 - Proportion of Randomly Sampled Small Businesses in San Antonio Meeting Accessibility Criteria Using the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (March - April 1999)

Areas of Accessibility Evaluated	Businesses Surveyed (n = 121)	
	Number	Percent
Handicapped Parking		
Fail to meet minimum requirement	104	86.0
Met minimum requirement	17	14.0
Ramps		
Fail to meet minimum requirement	85	70.2
Met minimum requirement	36	29.8
Doors/Entries		
Fail to meet minimum requirement	85	70.2
Met minimum requirement	36	29.8
Public Restrooms		
Not available	70	57.9
Available	51	42.1
Fail to meet minimum requirement	45	88.2
Met minimum requirement	6	11.8
Telephones		
Not available	71	58.7
Available	50	41.3
Fail to meet minimum requirement	25	50.0
Met minimum requirement	25	50.0
Water fountains		
Not available	90	74.4
Available	31	25.6
Fail to meet minimum requirement	16	51.6
Met minimum requirement	15	48.4
Other Physical Barriers		
None	34	28.1
Fixed Barriers Only	46	38.0
Movable Barriers Only	28	23.1
Both Fixed and Movable Barriers	13	10.7

Table 6 - Number of Discrepancies Among Randomly Sampled Businesses in San Antonio by Building Construction/Alteration Relative to 1990 (March - April 1999)

Number of Discrepancies ^{a,b}	Construction/Alteration			Businesses		
	Before 1990		After 1990	Construction/Alteration	Total	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
0	3	16.7	1	1.0	4	3.3
1	5	27.8	3	2.9	8	6.6
2	5	27.8	9	8.7	14	11.6
3	3	16.7	26	25.2	29	24.0
4	1	5.6	41	39.8	42	34.7
5	0	0.0	14	13.6	14	11.6
6	1	5.6	9	8.7	10	8.3
7	0	0.0	0	0.0	0	0.0
n =	18		103		121	

^aThe seven areas evaluated were 1) handicapped parking, 2) ramps, 3) doors/entryways, 4) restrooms, 5) telephones, 6) water fountains, and 7) other physical barriers.

^bMultiple discrepancies within an area received a single count.

**Table 7 - Survey Results from a Random Sample of Small Businesses in San Antonio
(March - April 1999)**

Criteria	Businesses	
	Number	Percent ^f
Handicapped Parking (n = 121)		
Met all HC Parking Requirements	17	14.0
No Designated HC Parking Available	36	29.8
Inadequate HC Parking	68	56.2
Inadequate Number of HC Spaces ^a	58	85.3
Inadequate Van Accessibility ^b	48	70.6
Inadequate Access Aisle (Striped Spacing)	57	83.8
No Striping by HC Space	20	35.1
< 60 inches for HC Spaces ^c	31	54.4
< 96 inches for Van Accessible HC Spaces ^c	6	10.5
No HC or Van Accessible HC Placard Posted	33	48.5
Sloped or Unleveled Ground	11	16.2
Ramps (n = 121)		
Met all Ramp Recommendations	36	29.8
No Ramps Available	33	27.3
Inadequate Ramps	52	43.0
Ramp Projecting into Access Aisle is Unlevel	26	50.0
Crosses Path without Grade/Flare Protection	24	46.2
Excessive Ramp Grading ^d	49	94.2
No Handrails	46	93.9
No Edge Guard	42	85.7
Doors/Entry Ways (n = 121)		
Met all Door/Entry Way Recommendations	36	29.8
Inadequate Door/Entry Ways	85	70.2
Handle Requires Tight Grasping, Pinching, or Twisting	17	20.0
Difficult to Open or Heavy Doors ^e	74	87.1
Threshold > 1/2 inches ^f	21	24.7
Public Restrooms (n = 51)		
Met all Recommendations	6	11.8
Inadequate Public Restrooms	45	88.2
No HC Stall Available	21	46.7
Inadequate HC Stalls	24	53.3
No HC Restroom Sign Posted	20	69.0
Narrow Door (<32 inches)	2	6.9
Inadequate Maneuverability ^g	12	41.4
No Support Bars Available in Stalls	2	6.9
Inaccessible sink ^h	2	6.9
No Hot Water/Drainage Pipe Insulation	11	37.9
Mirror Height is too High (> 40 inches)	9	31.0
Towel Dispenser is too High (> 54 inches)	11	37.9

^aBased on the total number of parking spaces

^bBased on dimension of existing HC space/striping

^cStriping requirements were based on posted HC versus Van Accessible spaces

^dExcessive grading was considered if grading was greater than 1:20 for distances greater than 72 inches

^ePound pressures greater than 8.5 pounds were considered excessive

^fOnly exterior doors and entry ways were evaluated

^gManeuverability was determined using a full sized wheelchair

^hBased on sink height, knee clearance, and floor space

ⁱPercent may add up to more than 100% because of multiple discrepancies

Table 8 - Descriptive Statistics for Selected Areas Surveyed in a Random Sample of Small Businesses in San Antonio (March - April 1999)

	Areas Surveyed	N	Mean	Std. Dev.	Min.	Max.	Q1	Median	Q3
Parking									
Total Number of Parking Spaces	121	53.1	121.5	0.0	828.0	10.0	23.0	46.5	
Number of HC Parking Spaces	121	2.8	7.7	0.0	57.0	0.0	1.0	2.0	
Distance from HC Parking to Ramp (ft) ^a	81	18.0	16.9	0.0	78.1	8.0	12.2	21.0	
Distance from HC Parking to Business (ft) ^b	85	73.8	67.2	6.3	477.8	34.3	55.0	95.1	
Width of Striped Spacing (ft)	85	6.0	5.7	0.0	31.8	3.3	5.2	8.0	
Ramps									
Distance from Ramp to Business (ft) ^c	88	52.1	63.5	4.3	469.8	16.8	34.8	69.8	
Doors									
Pound Pressure (lbs.) ^d	107	10.2	3.5	2.0	21.0	8.0	10.0	12.0	
Restroom Dimensions									
All Available Restrooms ^e									
Width (ft)	51	4.7	1.9	2.5	11.3	3.0	4.6	5.7	
Depth (ft)	51	6.2	1.9	3.0	11.0	4.8	5.5	8.0	
Designated HC Restrooms ^f									
Width (ft)	30	5.3	0.3	3.0	11.3	3.9	5.3	6.0	
Depth (ft)	30	6.9	1.8	4.0	11.0	5.0	7.0	8.1	

^aEighty-one businesses had both HC parking and ramps

^bEighty-five businesses had HC parking available

^cEighty-eight businesses had ramps available

^dBusinesses with automatic doors or doors left propped open for the duration of business hours were excluded

^eFifty-one businesses had public restrooms available

^fThirty businesses had HC restrooms, of these only 11 had universal HC signs posted. The remaining 19 HC restrooms were determined to be HC stalls by staff report or by design (support rails, wider door, etc.)

Table 9 - Additional Barriers Found During Random Sampling of 121 Small Businesses in San Antonio (March - April 1999)

Barriers	Number
Total Additional Barriers	134
Fixed Barriers	87
Steps	33
Steep Inclines/Paths	8
Uneven Paths	26
Narrow Path (<32 inches)	11
Ravine	1
Wall/Floor Projections	5
High Counters	3
Movable Barriers	43
Heavy Interior Door	1
Trash Receptacles	2
Plants	2
Vehicles	4
Furniture	5
Sales Displays	21
Storage Boxes	2
Mat/Rug	3
Debris	2
Hose	1
Other Barriers	4
Heavy vehicular traffic at parking/ramps	4

Table 10 - Comparison of Studies on Prevalence of Architectural Barriers

Barriers	Roberts (1986)	Martin (1987)	McClain & Todd (1990)	Couch (1992)	McCleain et al. ^a (1993)	Ahn ^b (1994)	Siedlecki (1999)
Parking Ramps	84.6%	38 pts = 100% accessible; Urban vs Rural stores = 23.9/23.4;	65.5% patrons preferred ramps to steps	47%	65%	42%	86.0%
Doors/Entries	53.8%	vs Rural stores = 23.9/23.4;	40%	34%	40%	42%	70.2%
Restrooms	100%	Grocery vs. convenience store=29.1/18.2					70.2%
Telephones	itemized but no counts						88.2%
Water Fountains							50.0%
Other Barriers							51.6%
Number of barriers found	0	1	≥ 2				71.9%
							3.3%
							6.6%
							90.1%

^anumbers based on HC parking, ramp, and BR being "present"

^bunclear how the survey was scored

Appendices

Appendix 1

Definitions of Terms as stated in the ADA of 1990

Sec. 201 (1) – A “public entity” means “any State or local government, or other instrumentality of a State or States or local government; and the National Railroad Passenger Corporation, and any commuter authority (as defined in section 103 (8) of the Rail Passenger Service Act).”

Sec. 202 (2) – A “qualified individual with a disability” means “an individual with a disability who, with or without reasonable modifications to rule, policies, or practices, the removal of architectural, communication, or transportation barriers, or the provision of auxiliary aids and services, meets the essential eligibility requirements for the receipt of services or the participation in programs or activities provided by a public entity.”

Sec. 301 (1) – A “commerce” means “travel, trade, traffic, commerce, transportation, or communication among the several states; between any foreign country or any territory or possession and any State; or between points in the same State but through another State or foreign country.”

Sec. 301 (2) – A “commercial facilities” means “facilities that are intended for nonresidential use; and whose operations will affect commerce. Such term shall not include railroad locomotives, railroad freight cars, railroad cabooses, railroad cars described in section 242 or covered under this title, railroad rights-of-way, or facilities that are covered or expressly exempted from coverage under the Fair Housing Act of 1968 (42 U.S.C. 3601 et seq.).”

Sec. 301 (6) – A “private entity” means “any entity other than a public entity [as defined in section 201 (1)].

Sec. 301 (7) – The following private entities are considered “public accommodations” for purposes of this title, “if the operations of such entities affect commerce –

- (A) an inn, hotel, motel, or other place of lodging, except for an establishment located within a building that contains not more than five rooms for rent or hire and that is actually occupied by the proprietor of such establishment as the residence of such proprietor;
- (B) a restaurant, bar, or other establishment serving food or drinks;
- (C) a motion picture house, theater, concert hall, stadium, or other place of exhibition or entertainment;
- (D) an auditorium, convention center, lecture hall, or other place of public gathering;
- (E) a bakery, grocery store, clothing store, hardware store, shopping center, or other sales or rental establishment;
- (F) a laundromat, dry-cleaner, bank, barber shop, beauty shop, travel service, shoe repair service, funeral parlor, gas station, office of an accountant or lawyer, pharmacy, insurance office, professional office of a health care provider, hospital, or other service establishment.
- (G) a terminal, depot, or other station used for specified public transportation;
- (H) a museum, library, gallery, or other place of public display or collection;
- (I) a park, zoo, amusement park, or other place of recreation;
- (J) a nursery, elementary, secondary, undergraduate, or postgraduate private school, or other place of education;
- (K) a day care center, senior citizen center, homeless shelter, food bank, adoption agency, or other social service center establishment, and

- (L) a gymnasium, health spa, bowling alley, golf course, or other place of exercise or recreation."

Sec. 301 (9) – The term “readily achievable” means “easily accomplishable and able to be carried out without much difficulty or expense. In determining whether an action is readily achievable, factors to be considered include –

- (A) the nature and cost of the action under this Act;
- (B) the overall financial resources of the facility or facilities involved in the action; the number of persons employed at such facility; the effect on expense and resources, or the impact otherwise of such action upon the operation of the facility
- (C) the overall financial resources of the covered entity; the overall size of the business of a covered entity with respect to the number of employees; the number, type, and location of its facilities; and
- (D) the type of operation or operations of the covered entity, including the composition, structure, and functions of the workforce of such entity; the geographic separateness, administrative or fiscal relationship of the facility or facilities in question to the covered entity.”

Appendix 2 – Architectural Barriers/Compliance Site Survey

Business Numeric Code: _____

Last Building Construction/Alteration: before / after 1990

Type of Business: _____

(1) Handicapped Parking:

- closest HC parking to business: ___ ft. ___ in. None – skip to #2)
- # HC slots: ___ Measurement between slots ___ ft. ___ in.
- # Van HC slots: ___ Measurement between slots ___ ft. ___ in.
- # total parking slots: ___
- HC parking only placard posted: ___ Yes / ___ No
- Level ground: ___ Yes / ___ No

(2) Ramps:

- closest ramp to HC parking: ___ ft. ___ in. None – skip to #3)
- ramp projecting into the access aisle is level in all directions: ___ Yes / ___ No
- curb ramp located across a circulation path has graded or protected flare: ___ Yes / ___ No
- grading:
 - ___ < 1:20
 - ___ ≥ 1:20 handrails?: ___ Yes / ___ No edge protection?: ___ Yes / ___ No

(3) Doors/Entries:

- shortest (paved/usable) distance from ramp to serviceable door: ___ ft. ___ in.
- door opens: ___ inward / ___ outward / ___ retracts laterally
- automatic door: ___ Yes / ___ No (if switch required, height of switch: ___ ft. ___ in.)
- handles: ___ pinch or grip / ___ turn / ___ open
- ease of opening: ___ pounds of pressure to open
- raised threshold lip: ___ Yes / ___ No

(4) Restrooms:

- HC stall available: ___ Yes / ___ No
- door opens: ___ outward / ___ inward
- maneuverability: ___ Yes / ___ No
- dimensions: width: ___ ft. ___ in. depth: ___ ft. ___ in.
- support rails: ___ Yes / ___ No
- HC restroom sign posted: ___ Yes / ___ No
- mirror with adjusted height available: ___ Yes / ___ No
- sink with adjusted height available: ___ Yes / ___ No
- sink pipes insulated or protected: ___ Yes / ___ No
- paper towel dispenser with adjusted height available: ___ Yes / ___ No

(5) Telephones:

- adjusted height available: ___ Yes / ___ No

(6) Water Fountains:

- adjusted height available: ___ Yes / ___ No

(7) Other Physical Barriers:

- Fixed (list): _____
- Movable (list): _____

Letter of Information

Dear Business Owner/Manager:

I am a graduate student of The University of Texas, School of Public Health in Houston, Texas and would appreciate your help with my research project. Your business has been selected as a participant in a community wide study of physical disability/wheelchair access. In return for your cooperation, you will receive a free copy of your business' evaluation, recommendations, available resources, and a complimentary copy of the *Accessibility Manual to enhance customer access*.

To assure confidentiality, no business names or addresses will be included in any publications. All data gathered, as a part of this study, will be combined, therefore no results for an individual business or names will be printed or otherwise distributed. Participation in this study is voluntary and businesses wishing to decline will not be surveyed, however this study is being conducted by a student and your cooperation is sincerely appreciated. The study has been approved by the Committee for the Protection of Human Subjects (CPHS) of the University of Texas Health Science Center at Houston (CPHS-SPH-99-016).

I will contact you by telephone 1 to 2 days prior to my visit. I hope to schedule a time that is convenient for both you and your business. The survey should require no more than 15 minutes to complete. If you have any questions, please feel free to call me at (210) 545-4864 or CPHS at (713) 500-5827,

Your help is greatly appreciated and thank you for your cooperation.

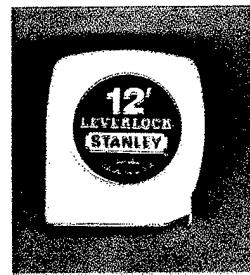
Sincerely,

Chung M. Siedlecki
Graduate Student

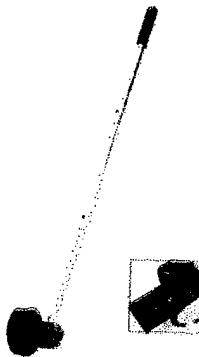
Appendix 4 – Equipment Description



Zebco Fisherman's® De-Liar
Fish scale Model 228
Made in the U.S.A. - patented
Capacity: 0 – 28 lbs.

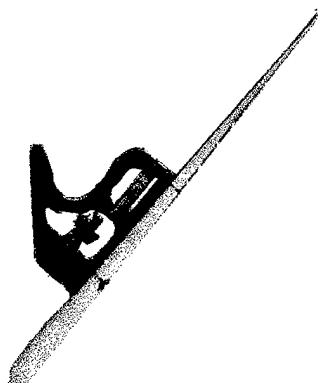


Stanley Leverlock 12'
Retractable Metal Measuring Tape
Model 30-982
Made in the U.S.A.

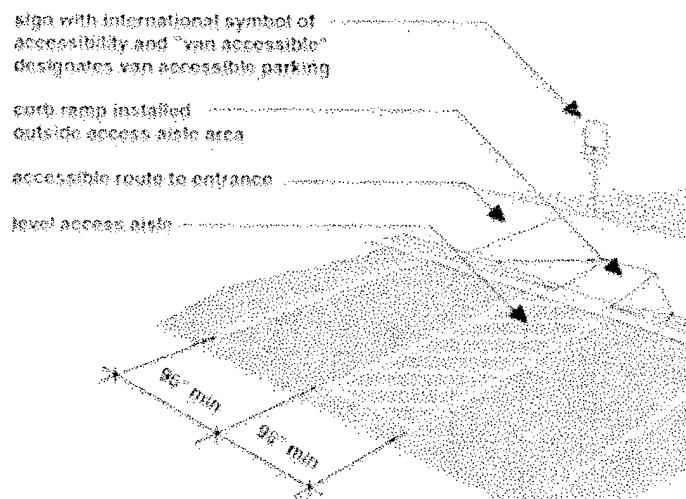


Rolatape
Measure Master-12 Series
Rolatape Corporation
2701 N. Van Marter Drive
Spokane, WA 99206 USA

Appendix 5 – Specially designed level



Appendix 6 – Ramps and Walkways



USDOJ (1996)

ADA. *Common Questions: Readily Achievable Barrier Removal, Design Details: Van Accessible Parking Spaces.*

Appendix 7 - Business Architectural Barrier Evaluation

(1) Handicapped Parking

- Adequate
- Inadequate (recommendations):
 - Add ___ handicapped parking spaces (ratio 1:25 of total parking spaces)
 - Add ___ van handicapped parking spaces (ratio of 1:8 of handicapped spaces; *minimum =1*)
 - Increase yellow striped spacing adjacent to HC parking spaces
 - 5 feet access area for non-van handicapped parking spaces
 - 8 feet access area for van handicapped parking spaces
 - Correct grading of parking to ensure it is level

(2) Ramps

- Adequate
- Inadequate (recommendations):
 - Level ramp projection in all directions
 - Grade or protect flare of ramp crossing walkway
 - Reduce lip to less than $\frac{1}{2}$ inch
 - Decrease grade to less than 1:12 (grades greater than 1:20 for distance greater than 72 inches requires handrail and edge protection)

(3) Doors/Entries

- Adequate
- Inadequate (recommendations):
 - Open handled door handles
 - Reduce threshold lip to less than $\frac{1}{2}$ inch

(4) Restrooms

- Not Applicable
- Adequate
- Inadequate (recommendations):
 - Increase stall width to accommodate full sided wheelchair
 - Add support handles in HC stall
 - Post HC restroom sign
 - Adjust sink height
 - Insulate exposed sink pipes
 - Adjust towel dispenser height
 - Adjust mirror height

(5) Telephones

- Not Applicable
- Adequate
- Inadequate (recommendations):
 - Adjust height of telephone

(6) Water Fountains

- Not Applicable
- Adequate
- Inadequate (recommendations):
 - Adjust height of water fountain

(7) Other Physical Barriers

- Not found
- Barriers removal recommendations: _____

Evaluations performed by Chung Siedlecki (Student UTHSC-Houston) _____

Appendix 8 - ADA Information Sources

U.S. Department of Justice ADA Information Line: 1 (800) 514-0301

Internet: <http://www.usdoj.gov/crt/ada/adahom1.htm>

USDOJ (1998). "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities." Government Document Number Y3.B27: 8 Am 3/3. (Washington DC: GPO, 1998) or <http://www.legal.gsa.gov/fedfra6a.htm>.

USDOJ (1996). "Americans with Disabilities Act. Common Questions: Readily Achievable Barrier Removal, Design Details: Van Accessible Parking Spaces." ADA Technical Assistance Updates from the U.S. Department of Justice, Number 1. (Washington DC: U.S. Dept. of Justice, Civil Rights Division, Disability Rights Section)

USDOJ (undated). "Americans with Disabilities Act Design Guide I – Restriping Parking Lot." (Washington DC: U.S. Dept. of Justice, Civil Rights Division, Disability Rights Section, ADA Information Line 1-800-514-0301 FAX #3208) or <http://www.usdoj.gov/crt/ada/adahom1.htm>.

USDOJ (1996). "Americans with Disabilities Act Guide for Small businesses." Government Document Number J1.8/2: D63. (Washington DC: U.S. Dept. of Justice, Civil Rights Division, Disability Rights Section) or <http://www.usdoj.gov/crt/ada/smbusgd.pdf>

USDOJ (1997). "The Americans with Disabilities Act: Questions and Answers." Government Document Number Y3.EQ2: 2 Am 3/2/97. (Washington DC: U.S. Equal Employment Opportunity Commission: U.S. Dept. of Justice, Civil Rights Division) or <http://www.usdoj.gov/crt/ada/ada.html>.

USDOJ (1997). "Common ADA Errors and Omissions in New Construction and Alterations." Government Document number J1.2: Am 3/14. (Washington DC: U.S. Dept. of Justice, Civil Rights Division, Disability Rights Section) or <http://www.usdoj.gov/crt/ada/adahom.htm>.

USDOJ (undated). "Myths and Facts about the Americans with Disability Act." (Washington DC: U.S. Dept. of Justice, Civil Rights Division, Disability Rights Section, ADA Information Line: 1-800-514-0301 FAX #3105) or <Http://www.usdoj.gov/crt/ada/pubs/mythfct.txt>.

For Information about Tax Credits and Deductions, contact:

Internal Revenue Service: 1 (800) 829-1040

For Information on the ADA Accessibility Guidelines, contact:

Access Board: 1 (800) 872-2253

Internet: <http://www.access-board.gov/>

Appendix 9 – Map of San Antonio with Randomly Selected Small Businesses Surveyed

**Appendix 10 – Map of San Antonio with Randomly Selected Small Businesses Surveyed
Relative to Education (Percent College Graduation)**

**Appendix 11 – Map of San Antonio with Randomly Selected Small Businesses Surveyed
Relative to Income (Median Household Income)**

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Access Board (1994). "Rehabilitation Act of 1973." Government Document Number Y3.B27: 5L44/3. (1331 F St., N.W., Suite 1000, Washington DC 20004-1111) or <http://www.legal.gsa.gov/fedfra6a.htm>.

Access Board (1998). "Americans with Disabilities Act Accessibility Guidelines for Building and Facilities." Government Document Number Y3.B27: 8 Am 3/3. (1331 F St., N.W., Suite 1000, Washington DC 20004-1111) or <http://www.legal.gsa.gov/fedfra6a.htm>.

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VITA

Chung M. (Young) Siedlecki was born in Hong Kong, Colony of Great Britain, on 31 May 1959, and the daughter of Soo Hoo Quen Ming and the late Ching Mou Young. Upon graduating from Little Flower Catholic High School for Girls, Philadelphia, Pennsylvania, in 1977, she enlisted into the United States Air Force. In 1982, while stationed at Hickam Air Force Base, Hawaii, she attended The University of Hawaii at Manoa. As a result of a military transfer, she moved to San Antonio, Texas, where she continued her studies at The University of Texas at San Antonio. She graduated from The University of Texas at San Antonio summa cum laude with a Bachelor of Science degree in Biology in 1986. She continued graduate level education at The University of Texas at San Antonio until August 1987 when she began her medical training. She attended The Uniformed Service University Health Science Center, Bethesda, Maryland, and received a Doctor of Medicine degree in 1991. She received her post-graduate residency training in Family Practice at USAF Malcolm Grow Medical Center, Andrews Air Force Base, Maryland. She completed her residency in 1994, and was board-certified in Family Practice that same year. She currently holds the rank of Major and continues to serve with the US Air Force as a family physician and flight surgeon. She is married to Gary A. Siedlecki of Twinsburg, Ohio. They have three daughters, Andrea, Carrie, and Elizabeth.

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